



# PATENT ABSTRACTS OF JAPAN

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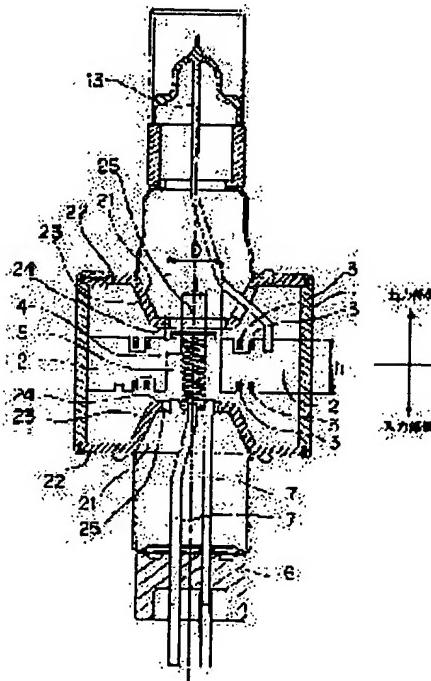
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## (54) MAGNETRON

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To suppress noise by forming asymmetrically with respect to a tube axis, a small diameter flat surface of at least one pole piece, arranged at each end of an anode cylinder, for guiding magnetic face into the acting space between a cathode and a vein.

**SOLUTION:** A pole piece 21, arranged in an opening part at each end of an anode cylinder 1, has a large diameter flat part 22, a slanting part 23 projecting toward a vane 2 as approaching the center, and a small diameter flat part 24 in the central part of the slanting part 23. A circular through-hole 25 is formed in the eccentric position to the tube axis of the small diameter flat part 24. The eccentric positions of the through-holes 25 are arranged, so as to be about 180 degrees symmetric with respect to the tube axis in the pole pieces 21 on the upper side and the lower side. Magnetic field strength and the direction of a magnetic flux become asymmetric with respect to the tube axis, electron orbital motion on the end side in the tube axial direction of an acting space 5 becomes discontinuous, so that oscillation in this part is suppressed to prevent multiple oscillations, and only the main oscillation in the central part is generated.



## LEGAL STATUS

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**CLAIMS**

[Claim(s)]

[Claim 1] A magnetron characterized by having had pole piece characterized by providing the following, and forming a minor diameter flat side of one [ at least ] pole piece in an unsymmetrical configuration to a tube axis An anode plate barrel Cathode arranged on a tube axis of this anode plate barrel A stem structure which fixes to an end side of said anode plate barrel, and carries out support immobilization of the cathode A minor diameter flat side which is arranged in a vein of two or more sheets arranged in a radial by inner skin of said anode plate barrel, an aerial lead connected to said vein, the output section which fixes to an other end side of said anode plate barrel, and surrounds an aerial lead, and both ends of said anode plate barrel, and leads magnetism to interaction space between cathode and a vein

[Claim 2] A magnetron characterized by having arranged in a location which rotated one pole piece 180 abbreviation to a tube axis to pole piece of another side while having pole piece of the shape of isomorphism of a pair characterized by providing the following and forming a minor diameter flat side of said pole piece in an unsymmetrical configuration to a tube axis An anode plate barrel Cathode arranged on a tube axis of this anode plate barrel A stem structure which fixes to an end side of said anode plate barrel, and carries out support immobilization of the cathode A minor diameter flat side which is arranged in a vein of two or more sheets arranged in a radial by inner skin of said anode plate barrel, an aerial lead connected to said vein, the output section which fixes to an other end side of said anode plate barrel, and surrounds an aerial lead, and both ends of said anode plate barrel, and leads magnetism to interaction space between cathode and a vein

[Claim 3] A magnetron which is equipped with the following and characterized by having carried out displacement of the through hole formed focusing on the abbreviation for said pole piece to a tube axis, and forming it. An anode plate barrel Cathode arranged on a tube axis of this anode plate barrel A stem structure which fixes to an end side of said anode plate barrel, and carries out support immobilization of the cathode Pole piece which leads magnetism to interaction space between a vein of two or more sheets arranged in a radial by inner skin of said anode plate barrel, an aerial lead connected to said vein, the output section which fixes to an other end side of said anode plate barrel, and surrounds an aerial lead, and said cathode and vein

[Claim 4] A magnetron which is equipped with the following and characterized by making hard flow carry out displacement of the through hole of each other formed focusing on the abbreviation for said pole piece to a tube axis. An anode plate barrel Cathode arranged on a tube axis of this anode plate barrel A stem structure which fixes to an end side of said anode plate barrel, and carries out support immobilization of the cathode Pole piece of a pair which is arranged in a vein of two or more sheets arranged in a radial by inner skin of said anode plate barrel, an aerial lead connected to said vein, the output section which fixes to a many-items side of said anode plate barrel, and surrounds an aerial lead, and both ends of said anode plate barrel, and leads magnetism to interaction space between cathode and a vein

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**DETAILED DESCRIPTION**

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the magnetron used for microwave heating devices, radars, etc., such as a microwave oven.

[0002]

[Description of the Prior Art] If the magnetron used for the conventional home microwave oven etc. is explained based on the important section cross section shown in drawing 10, 1 will be an anode plate barrel and will form two or more resonant cavities which have the vein 2 of two or more sheets arranged in the radial by the inner skin, and are surrounded by the adjacent vein 2 and the inner circle wall of the anode plate barrel 1. 3 is a strap ring which connects said vein 2 alternately.

[0003] 4 is the cathode arranged in the space surrounded by said vein 2, and interaction space 5 is formed between veins 2. The stem structure to which 6 carries out support immobilization of said cathode 4 through a lead terminal 7, and 8 are the pole piece arranged in the double door opening edge of said anode plate barrel 1. The major-diameter flat part 9, a ramp 10, and the minor diameter flat part 11 formed in the center section of the ramp 10, The magnetism of the magnet which is not illustrated is led to interaction space 5 that it has the through hole 12 formed in the center section of the minor diameter flat part 11, it should combine with the direct current voltage impressed between a vein 2 and cathode 4, and a rectangular electrostatic magnetic field should be formed in interaction space 5.

[0004] In the magnetron of the above-mentioned configuration, the electron emitted from cathode 4 rotates to a circumferential direction, approaches a vein 2, becomes the form of an electron cloud, and energy conversion is carried out to a resonant cavity by the rectangular electrostatic magnetic field. Consequently, the feeble microwave in a resonant cavity is amplified and it emanates in warehouses, such as a microwave oven, from the aerial lead 13 by which the vein 2 was electrically connected to one sheet.

[0005] However, in the magnetron of a configuration of having mentioned above, the magnetic field strength in interaction space 5 had become an ununiformity in the shaft orientations of a vein 2. That is, since the line of magnetic force between the pole piece 6 draws a circle and goes to the pole piece 6 of another side from one pole piece 6, line of magnetic force swerves from interaction space 5 to a vein 2 or cathode 4 side in the core of the gap between the pole piece 6. Therefore, when the magnetic field strength in interaction space 5 was seen, as shown in drawing 11, the shaft-orientations edge side of a vein 2 had become distribution stronger about 16% than a center section.

[0006] the ratio of the field strength E in this rectangular electrostatic magnetic field, and magnetic field strength B -- the value of E/B -- an electronic rotational speed -- being decided -- magnetic field strength B -- the direction of a tube axis -- setting -- an ununiformity -- since \*\*\*\*, an electronic rotational speed also becomes uneven and causes a multiplex oscillation. The frequency deviation at the time of this multiplex oscillation serves as a noise revealed outside from the cathode side edge child of a magnetron, and there is a problem that do active jamming to reception of radio, television, etc., or the frequency of a multiplex oscillation itself does active jamming to a communication link. Drawing 12 shows the

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TECHNICAL FIELD

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[The technical field to which invention belongs] This invention relates to the magnetron used for microwave heating devices, radars, etc., such as a microwave oven.

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**EFFECT OF THE INVENTION**

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**[Effect of the Invention]** According to the configuration of this invention, with an easy configuration, a multiplex oscillation can be mitigated and the effect of being able to reduce generating of a noise is done so.

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**MEANS**

[Means for Solving the Problem] Cathode where the 1st means of this invention has been arranged on a tube axis of an anode plate barrel and this anode plate barrel, A stem structure which fixes to an end side of said anode plate barrel, and carries out support immobilization of the cathode, A vein of two or more sheets arranged in a radial by inner skin of said anode plate barrel, and an aerial lead connected to said vein, The output section which fixes to an other end side of said anode plate barrel, and surrounds an aerial lead, It has pole piece which has a minor diameter flat side which is arranged in both ends of said anode plate barrel, and leads magnetism to interaction space between cathode and a vein, and is characterized by forming a minor diameter flat side of one [ at least ] pole piece in an unsymmetrical configuration to a tube axis.

[0009] Cathode where the 2nd means of this invention has been arranged on a tube axis of an anode plate barrel and this anode plate barrel, A stem structure which fixes to an end side of said anode plate barrel, and carries out support immobilization of the cathode, A vein of two or more sheets arranged in a radial by inner skin of said anode plate barrel, and an aerial lead connected to said vein, The output section which fixes to an other end side of said anode plate barrel, and surrounds an aerial lead, While having pole piece of the shape of isomorphism of a pair which has a minor diameter flat side which is arranged in both ends of said anode plate barrel, and leads magnetism to interaction space between cathode and a vein and forming a minor diameter flat side of said pole piece in an unsymmetrical configuration to a tube axis It is characterized by having arranged in a location which rotated one pole piece 180 abbreviation to a tube axis to pole piece of another side.

[0010] Cathode where the 3rd means of this invention has been arranged on a tube axis of an anode plate barrel and this anode plate barrel, A stem structure which fixes to an end side of said anode plate barrel, and carries out support immobilization of the cathode, A vein of two or more sheets arranged in a radial by inner skin of said anode plate barrel, and an aerial lead connected to said vein, It is characterized by having had pole piece which leads magnetism to interaction space between the output section which fixes to an other end side of said anode plate barrel, and surrounds an aerial lead, and said cathode and vein, having carried out displacement of the through hole formed focusing on the abbreviation for said pole piece to a tube axis, and forming.

[0011] Cathode where the 4th means of this invention has been arranged on a tube axis of an anode plate barrel and this anode plate barrel, A stem structure which fixes to an end side of said anode plate barrel, and carries out support immobilization of the cathode, A vein of two or more sheets arranged in a radial by inner skin of said anode plate barrel, and an aerial lead connected to said vein, The output section which fixes to a many-items side of said anode plate barrel, and surrounds an aerial lead, It has pole piece of a pair which is arranged in both ends of said anode plate barrel, and leads magnetism to interaction space between cathode and a vein, and is characterized by making hard flow carry out displacement of the through hole of each other formed focusing on the abbreviation for said pole piece to a tube axis.

[0012]

[Embodiment of the Invention] The gestalt of operation of this invention is explained in full detail below

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the cross section showing the gestalt of operation of this invention.

[Drawing 2] It is the cross section of this pole piece.

[Drawing 3] It is the plan of this pole piece.

[Drawing 4] It is drawing showing this magnetic-field-strength distribution.

[Drawing 5] It is drawing showing this frequency wave.

[Drawing 6] It is the cross section of pole piece showing the gestalt of operation of \*\*\*\*.

[Drawing 7] It is the plan of this pole piece.

[Drawing 8] It is the cross section of pole piece showing the gestalt of operation of \*\*\*\*.

[Drawing 9] It is the plan of this pole piece.

[Drawing 10] It is the cross section showing the conventional magnetron.

[Drawing 11] It is drawing showing this magnetic-field-strength distribution.

[Drawing 12] It is drawing showing this frequency wave.

[Description of Notations]

1 Anode Plate Barrel

2 Vein

4 Cathode

5 Interaction Space

21 Pole Piece

24 Minor Diameter Flat Part

25 Through Hole

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